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ABSTRACT

This paper summarizes studies conducted to predict various educational outputs or other measures of quality from measures of student and community input and educational processes, groups the studies by the type of output measure used, and searches for trends in the results. The data are arranged in five columns in an extensive chart. The first column gives the name of the researcher(s), the date of publication, and something of the locale or the scale of the research. Complete references are given the end of the paper. The second column gives what is usually treated as a dependent variable--some measure of output or presumed quality. The final three columns list independent variables that have been used to predict the dependent variable. They are arbitrarily divided into three groups: socioeconomic status and community, student characteristics, and variables over which the school has some immediate control--program, expenditures, teacher characteristics, finances, and the like. Much of the conventional wisdom about students, schools, and achievement is borne out by the research reported in these studies. For instance, such measures of socioeconomic status as family income, father's occupation, race, and educational attainment of parents are all highly correlated. (Author/IRT)

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A SUMMARY OF SELECTED MAJOR STUDIES WHICH ASSOCIATE INPUT AND PROCESS VARIABLES WITH VARIOUS MEASURES OF SCHOOL QUALITY OR OUTPUT

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Introduction

In recent years a number of studies have been conducted to predict various educational outputs or other measures of quality from measures of student and community input and educational processes. Although several writers have prepared summaries of these studies, no known paper has attempted to group the studies by the type of output measure and search for trends. This paper attempts to perform that function.

Although in studies of correlation and prediction it is dangerous to infer cause-and-effect relations, the inference of cause-and-effect becomes more plausible when the same (or similar) variables appear to be associated in a number of studies, each with a different thrust or set of circumstances. Even a cursory glance at the lengthy chart which follows will show pairs of the same (or similar or highly correlated) variables showing up over and over. At the very least, these associations should give direction to researchers in refining studies and focusing on carefully controlled variables in order to establish cause-and-effect relationships.

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In the chart that follows, the data are arranged in five columns. In the first column is given the name of the researcher(s), the date of the publication of the research, and something of the locale or the scale of the research. Complete references may be found at the end of the paper. In the second column is given what is usually treated as a dependent variable—that is, some measure of output or presumed quality.

The final three columns consist of lists of independent variables that have been used to predict the dependent variable in the second column. These predictors have been arbitrarily divided into three groups by this author. The column headed "SES and Community" contains variables usually considered measures of the socio-economic status and environment of the student and the school. The column headed "Student Characteristics" contains variables about an individual student—sex, achievement, aspirations, attitudes, and so on. The final column contains variables over which the school has some immediate control—program, expenditures, teacher characteristics, finances, organization, etc.

Some variables are listed with a (-) sign, which indicates some sort of inverse relationship. Unfortunately, not all studies reported the direction of the relationships; accordingly, some of the variables reported in the chart may be inversely related though this is not indicated. At the very least, this complicates the process of making inferences and determining educational policy.

All predictor variables listed were reported as either being highly correlated with the dependent variable or as being statistically significant (often at the .05 or the .01 level) in a predictor equation.

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
General or Composite Measures of Quality				
Treadway, 1962 (Arkansas)	SDE rating	Level of financial support		Size of district Supervisory service Class size High school expenditures Dual educational program Teacher turnover Teacher qualifications
Clark, 1967 (Kentucky)	Effectiveness index	Local educational background		Per pupil expenditure Teachers' salaries
Miles, 1968 (Arkansas)	SDE rating			Teachers' salaries Local salary supplements Expenditures for instructional materials Units of credit offered % teachers holding at least masters degree

		Predictors		
Researcher	Measure	SES and Community	Student Characteristics	School and Teacher
General or Composite Measures of Quality				
Burton, 1969 (Washington)	Elementary School Quality Prediction Form			$ Pupil services Payments to other districts $ Operation of plant $ Community services $ Library services Has textbook program
Zotos, 1971 (several states)	Indicators of Quality	Mean family income		$ State aid $ Debt service Elementary teacher numerical staffing adequacy $ Average other professional salaries $ Raised locally

		Predictors		
Researcher	Measure	SES and Community	Student Characteristics	School and Teacher
General Measures of Cognitive Achievement				
Coleman, et al., 1966 (national)	Pupil Achievement	Parents' level of education Educational backgrounds and aspirations of other students	Level of education	Teachers' scores on verbal skills test
Igoe, 1968 (New York)	ITED scores			Teachers' salaries Teacher training and experience Salaries for superintendent and assistants Library expenses
Raymond, 1968 (West Virginia)	Weighted college freshman GPA			Average teacher salary Average elementary teacher salary
Raymond, 1968 (West Virginia)	Weighted ACT score			Average starting salary Average teacher salary Average elementary teacher salary
Kiesling, 1971 (summary of 15 studies)	Pupil Performance	% blacks in school below 50		Teacher experience Verbal ability of teacher Teacher turnover (-) Provision of adequate management resources Tracking for white students Tracking for minority students (-)

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
General Measures of Cognitive Achievement				
Averch, et al., 1972 (summary of 19 studies)	Educational outcome	Parent's income Parent's education Parent's occupation		
Evans, 1972 (Mississippi)	% Rejections by local Selective Service Boards for mental reasons	Median grade attainment (-) % Population non-white Median family income (-)		Average years experience of teachers $ Maintenance of plant/pupil
Evans, 1972 (Mississippi)	ACT composite score	% Population non-white(-) % Enrollment low-income families (-) Expenditures from Title I(-)		Elementary pupils/ teacher % Teachers holding masters $ Operation of plant/ pupil County school district (-)
Jencks, 1972 (national)	# of years of school received, whites	Father's occupation		
Menges, et al., 1972 (4 states)	Effectiveness of compensatory programs			Up to $300/pupil supplement Over $300/pupil supplement (-)

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
General Measures of Cognitive Achievement				
Bane and Jencks, 1973 (national)	School output	Character of entering students		
Mayeske, et al., 1973 (national)	"Achievement"	Standard of performance set by schoolmates Composition of student body	Educational plans and desires Attitude toward life	
Bryant, Glaser, Hansen, and Kirsch, 1974 (summary of 53 studies)	Academic Achievement	Family composition Student-parent relationships Race Geographic location	Sex	School and teacher variables
Heim and Perl, 1974 (summary of number of studies)	Cognitive domain development	Student SES Race	Student IQ	Teacher degree status Teacher SES or verbal ability
General Measures of Cognitive Achievement at a Grade Level				
Hanushek, 1970 (California)	SAT scores, white 3rd graders (parents in manual occupation) (Parents in non-manual occupation)	Father has clerical job(-)	Sex Grade repeated (-) 1st grade SAT score	Teacher time spent in discipline (-) 3rd grade teacher's verbal facility 2nd grade teacher's years since educational experience (-)

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
General Measures of Cognitive Achievement at a Grade Level				
Dunnell, 1970 (Illinois)	SAT scores 4th grade	Median value of homes Median income of family Median grade attainment % Non-white % Professional and Managerial workers		Special teachers/1000 students % Teachers with at least masters ADA/enrollment Beginning masters salary Beginning bachelors salary Central office administrators/ 1000 students Enrollment
Gilbert, 1963 (California)	5th grade SAT scores	Overcrowded housing Adult educational level % of working married women with children under six		Training and experience of teachers Total school tax rate Quality of teacher salary
	Achievement, 5th grade, black students	Reading material in home # of siblings Parents' educational level	Student self-concept	Teachers' verbal ability Presence of science labs Average time spent in guidance Days in session Student's control of environment

		Predictors		
Researcher	Measure	SES and Community	Student Characteristics	School and Teacher
General Measures of Cognitive Achievement at a Grade Level				
Guthrie, 1971 (Michigan)	Achievement in 6th grade			Age of building (-) library volumes/ student Enrollment (-) % students transferring (-) Classrooms/1000 students Teachers attitude toward school Teachers attitude toward other teachers Teachers verbal ability
Dunnell, 1970 (Illinois)	SAT scores, 7th grade	Median value of homes Median income of family Median grade attainment % Non-white % Professional and managerial workers		Beginning bachelors salary ADA/enrollment Average class size # Supervisors/1000 students % Male teachers Students/building Library holdings/ student # Years to reach maximum salary
Campbell, 1970 (Oklahoma)	ITED scores, 9th grade	Per capita income % Low income students		Expenditure per pupil

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
General Measures of Cognitive Achievement at a Grade Level				
Averch and Kiesling, 1970 (6000 students)	9th grade achievement (by school average)			Expenditures for education % Teacher transfer(-) Average salary, male teachers # of tracks
	9th grade achievement (by student)			
Bowles, 1969 (national)	Composite achievement (by student)			Teachers with graduate training in field Class size in science and math (-) Tracking (-) % black (-)
Kiesling, 1971 (15 studies)	Performance of 12 grade Negro students			# of educational innovations Extent of science laboratory facilities

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
General Measures of Cognitive Achievement at a Grade Level				
Summers and Wolfe, 1975, (Philadelphia)	Change in achievement scores from 3rd grade to 6th grade to 8th grade; 9th grade to 12th grade	Headstart participant Residential moves in JHS (-) Not being 2nd generation American in JHS (-)	Elementary girls Elementary boys (-) Secondary boys Secondary girls (-) Good attendance	Elementary student below grade level in class of less than 28 Elementary student in class over 34 (-) JHS student in class over 32 (-) Black elementary student in small school Low achieving student in small high school Teacher with less than 7 years experience Teacher with more than 10 years experience High achieving elementary student with experienced teacher Low achieving elementary student with inexperienced teacher Low income elementary student with teacher whose undergraduate school has rating of at least 525 on Gourman Enrollment 40-60% black

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
General Measures of Cognitive Achievement at a Grade Level				
Summers and Wolfe, 1975, (Philadelphia) (continued)				Elementary student at grade level or lower school with many high achieving students JHS student in school with many high achieving students SHS student in school with large # of dropouts (-) School has few disruptions
Kiesling, 1969 (New York)	Differences in ITBS between 4th and 6th grades (urban)	Index of occupation(-)		Teachers/pupil (-) Expenditures/pupil (-)
	(rural)	Index of occupation		
Kiesling, 1970 (New York)	Differences in ITBS between 5th and 8th grades	Mother's educational level(-)		Teacher certification level Teacher experience Teacher salary (-) Administrative expense per pupil
Mollenkopf and Melville, 1956 (national)	9th and 12th grade achievement, differences	School in non-Southern state		Expenditures for supplies and library/ high school student
Cohn, 1968 (Iowa)	Increase in ITED score from 10th to 12th grade (Larger schools)			# Different teaching assignments/teacher (-)

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
General Measures of Cognitive Achievement at a Grade Level				
Cohn, 1968 (Iowa)	Increase in ITED score from 10th to 12th grade (larger schools)			# Different teaching assignments/teacher (-)
Mollenkopf and Melville, 1956 (206 schools)	10th and 12th grade achievement difference	Adult median years of schooling Median family income % Population born in state % Owner occupied homes Quality of housing		Size of 12th grade class Median starting salary, male teachers Expenditure/pupil, 9-12 Type of school # Days in school year # Books in library Newness of building Median starting salary, female teachers Average experience of teachers % Children in private schools Presence of guidance programs % Dropouts after entry into 10th grade % Males who went on to college # Grades in school(-)

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
General Measures of Cognitive Achievement at a Grade Level				
Mollenkopf and Melville, 1956 (206 schools) (continued)				Average class size in science and math (-) Average class size other than science and math (-) Amount homework expected (-) Daily % absent (-)

		Predictors		
Researcher	Measure	SES and Community	Student Characteristics	School and Teacher
Language Arts Achievement				
Keeler and McCall, 1973 (San Diego)	Reading ability	Social class of students(-)		Teacher turnover(-)
Office of Education Performance Review, 1974 (New York) 2 matched schools	Reading achievement			Administrative behavior Administrative policies Administrative practices
Research, Evaluation, and Assessment Services, 1974 (Michigan) (23 successful and 13 unsuccessful schools)	Compensatory Reading Program effectiveness			% Time district coordinator spends in planning Principal satisfied with curriculum decision methods # Teacher working hours at school/day Fraction of materials selected by teachers Use of periodicals as basic reading materials # Days of in-service training before project Degree to which children in project liked school Teacher knows % of

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
Language Arts Achievement				
Christopher, 1973 (Georgia)	Reading Grade 4	% Population non-white (-) Median grade attainment, male adults in community Median grade attainment, female adults in community(-) Required local financial effort (-)	Verbal ability, Grade 4 Non-verbal ability, Grade 4	Secondary pupils/ teacher (-)
Benson, et al., 1965 (California)	5th grade reading achievement (small districts)	Median household income		Instructional expenditures/ADA % Teachers in highest salary quartile(-) Teachers/administrator (-) %Teachers in lowest salary quartile (-)
	(medium-sized districts)	Median household income		%Teachers in highest salary quartile Mean teachers salary Teachers/administrator (-)
	(large districts)	Median household income		Teachers/administrator % Teachers in highest salary quartile(-)
Katzman, 1968 (Boston)	Reading, 6th grade	Index of cultural advantage		Size of school area Teacher inexperience (-) Students/staff (-)

Researcher	Measure	Predictors: SES and Community	Student Characteristics	School and Teacher
Language Arts Achievement				
Heim and Perl, 1974 (New York)	Reading improvement, 3rd grade to 6th grade	Socio-economic status %White Rural background (-)	Level of past performance	Class size (-) Teacher degree status % of schools in district using programmed learning % of schools in district using open circuit TV % of schools in district using performing arts Degree of inservice education
Christopher, 1973 (Georgia)	Reading, Grade 8	% on free or reduced price lunch (-)	Verbal ability, Grade 8 Non-verbal ability, Grade 8	
Fox, 1969 (Chicago)	Reading, 11th grade weighted stanine			Holding power Total teacher man years (-) Total textbook and library expenditure(-) Vocational class student hours (-)
Bunkhead, Fox, and Holland, 1967 (Large high schools)	11th grade reading 11th grade residual reading scores	Family income		Teacher experience

Researcher	Measure	SES and Community	Student Characteristics	School and Teacher
Language Arts Achievement				
Burkhead, Fox, and Holland, 1967 (continued)	12th grade reading scores	Family income		Newness of building Teacher experience Teacher salaries
	12th grade residual reading scores			#books in library/ 12th grader
Christopher, 1973 (Georgia)	Reading, Grade 12		Verbal ability, Grade 12	
Bowles, 1969 (national)	Reading, 12th grade, black males	Father's occupation Measure of consumer durables		Teacher with graduate training in subject Class size in science and math (-) Tracking (-)
Hanushek, 1968	Verbal scores, 6th grade, (white students)	Possessions in home Father's education, School in central city (-) %Black (-) %Attended nursery school	%Want to finish high school % Feel have little chance of success(-)	Teachers experience Teachers verbal ability %Students had non-white teacher previous year(-)
	(black students)	Possessions in home Family size(-) School in central city(-) %Black(-) %Attended nursery school	%Want to finish high school %Feel have little chance to success(-)	Teachers experience Teachers verbal ability

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
Language Arts Achievement				
Bowles, 1969 (national)	Math achievement, 10th grade black males	Father's occupation Measure of consumer durables		Teacher with graduate training in area Tracking(-) % black enrollment(-)
Winfield, 1970 (Ohio)	Math, 10th grade scores on OST		Math ability	ADM #9th grade math teachers in school Instructional cost/ total cost All purpose millage Average # hours in math courses of math teachers % of math teachers with earned graduate credit Length of school day State aid/pupil
Christopher, 1973 (Georgia)	Math, grade 12		Verbal ability, grade 12	Expenditure for transportation/pupil (-) Elementary pupils/ teacher(-)
Evans, 1972 (Mississippi)	Natural science, ACT	%Population non-white(-) %Enrollment from low-income families(-) Expenditures from Title I (-)		% Teachers holding a masters degree

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
Language Arts Achievement				
Fritze, 1969 (Minnesota)	High School English achievement	Socio-economic status of student	Student aptitude in English	
Evans, 1972 (Mississippi)	ACE scores, English	% Population non-white(-) % Enrollment from low-income families(-) Expenditures from Title I		Elementary pupils/ teacher Average years experience of teachers % teachers holding less than BA(-) Operation of plant/ pupil
Mathematics and Science Achievement				
Summers and Wolfe, 1975 (Philadelphia)	Math achievement			Teacher has 3-6 years experience Teacher has more than 10 years experience(-)
Christopher, 1973 (Georgia)	Math, grade 4	% Free or reduced price lunch(-) Required local financial effort(-)	Verbal ability, grade 4 Non-verbal ability, grade 4	Expenditure for plant operations/pupil
Christopher, 1973 (Georgia)	Math, grade 8	% Free or reduced price lunch(-)	Non-verbal ability, grade 8	Size of system(-)

Researcher	Measure	Predictors		
		SES and Community	Student Characteristics	School and Teacher
Levin, 1970 (large urban district in East)	Verbal score, 6th grade	Parents attitude Family size(-) Possessions Father's education	Students attitude Age of student(-)	Teacher experience Teacher's undergraduate institution
Michelson, 1970 (large Eastern city)	Verbal score, 6th grade, white		Age(-)	Teacher's experience Teacher was academic major in college
Burkhead, Fox, and Holland, 1967 (Large high schools)	10th grade verbal scores 10th grade residual verbal scores	family income		Registration by student at beginning of year(-) Teacher turnover(-)
Summers and Wolfe 1975 (Philadelphia)	English achievement			High ability JHS student with very experienced English teacher
Winfield, 1970 (Ohio)	10th grade English scores on Ohio Survey Test		Verbal ability	ADM The cube of the # teachers in 9th grade English Length school day All purpose millage State aid/pupil Pupils/teacher Pupils/counselor Local tax effort

Researcher	Measure	Predictors: SES and Community	Student Characteristics	School and Teacher
Social Studies Achievement				
Evans, 1972 (Mississippi)	Social Studies scores ACT	% Population non-white(-) % Enrollment from low income families (-) Expenditures from Title I (-)		% Teachers holding a masters degree Teaching supplies/ pupil Transportation cost/ pupil (-) Consolidated school district
Summers and Wolfe 1975 (Philadelphia)	Social Studies Achievement			High ability JHS student whose teacher holds undergraduate degree from school with high score on Gourman
Non-Cognitive Achievement				
Heim and Perl, 1974 (several studies)	Non-cognitive domain development	Student SES Student race	Student IQ	Teacher degree status Years of teaching experience Teacher SES or verbal ability
Levin, 1970 (Large urban district in East)	6th grade student attitudes	Mother in home(-)	Verbal score	Student attended kindergarten Teacher's satisfaction
Michelson, 1970 (Large city in East)	6th grade white students (attitudes) (aspirations)	Father's education Family size(-) Mother in home(-) Mother employed	Sex	Teacher turnover (-) Teacher's preference for another school

Researcher	Measure	Predictors: SES and Community	Predictors: Student Characteristics	Predictors: School and Teacher
Language Arts Achievement				
Research, Evaluation, and Assessment Services (Continued)				project children absent Presence of para-professional help Degree of teacher morale # Observations by reading specialist Non-professional tutorial is part of project % of time for professional tutorial, '72 - '73(-) % of time for professional tutorial, '73 - '74(-) Use of supplementary commercial reading texts Difficulty of reading materials (-) % of time spent by teacher other than teaching (-)

Possible Interpretations of the Summary

General or Composite Measures of Quality. It is difficult to form generalizations from the predictors of the general or composite measures of quality. Most of these measures are not really measures of output and thus are not well-predicted by input and process variables. It is likely that most dependent variables listed are semi-objective collections of data similar to the variables that are used to predict them, resulting in a sort of cyclical type of reasoning. Teacher salaries, teacher qualifications, provision of adequate leadership, general levels of expenditures, and size of class and school do appear frequently in one form or another.

General Measures of Cognitive Achievement. Several measures of socio-economic status appear repeatedly as predictors of cognitive achievement output. These include the racial composition of the school, family occupation of the head of the household, and the educational attainment of at least one parent. All of these appear elsewhere to be substantially correlated with each other. Among the school-related variables, the ones that appear frequently as predictors include teacher salaries, teacher verbal ability, degree of teacher training, and amount of teacher experience.

General Measures of Cognitive Achievement at a Grade Level. For the elementary grades, the socio-economic predictors of general cognitive achievement often include measures of family educational level, occupation, housing, and income. The school-related variables often related to the way money is spent for professional personnel--teacher salaries and staffing adequacy. The size of the school or the class appears several times. Teacher ability as measured by verbal skills, degree held, and experience also appear several times.

For the secondary grades, family income, housing, possessions, and other closely related variables appear to be even more important than in the elementary grades. The size of the school and class size appear a number of times in the data from secondary schools. Total per pupil expenditures and various measures of teacher salaries--probably closely related--appear frequently in the secondary data, as do the influence of peers and the availability of library materials and other instructional resources.

Language Arts Achievement

1. Reading. Measures of family income, social class, and race appear frequently as predictors of reading achievement. Measures of previous performance in reading or verbal skills appear to be good and consistent predictors of later performance. Among the school-related variables, various measures of supervision and leadership appear often. Supplementary human (para-professional) and printed resources (library, periodicals, etc.) are often related to reading achievement. Teacher salaries, pre- and in-service training, experience, staffing ratios, and actual time spent in teaching appear often among the predictor variables for reading.

2. Verbal. Measures of family possessions, educational level, and race are often found to be predictors of verbal scores. Student aspirations and attitudes have been found to be substantial predictors. Teacher experience, teacher verbal ability, and the nature and quality of the teacher's undergraduate preparation are shown to be predictors of verbal ability.

3. English. General measures of socio-economic status predict output in English, according to the studies reported. Measures of pupil-teacher ratio and the experience of teachers also appear to be important predictors of scores in English.

Mathematics and Science Achievement. Measures of family income predict scores on mathematics and science achievement, as do measures of both verbal and non-verbal ability. The school-related factors that have been found to be predictors include the experience and training of teachers, pupil-teacher ratios, and the size of schools and classes.

Achievement in Other Areas. Because of the small number of studies included in this paper which deal with other areas of achievement, no attempt at summary will be made, except to note that the same common measures of socio-economic status and school-related factors (teacher training, experience, and verbal ability) also appear in these studies.

Conclusion. Much of the conventional wisdom about students, schools, and achievement is borne out by the research reported in these studies. Sociological research points out that such measures of socio-economic status as family income, father's occupation, race, educational attainment of one or both parents, etc. are all rather highly correlated. It is important to note that most of these input-output studies include one or more measures of socio-economic status. Although these data were not reported in this paper, reading these studies reveals that the measures of socio-economic status are often major predictors of the output variable. In some cases, the prediction equations would require extraordinary changes in the school-related variables to compensate for the impact that the socio-economic variables make on the prediction of the output variables.

Among the school-related variables, various measures of salaries appear often. However, salary may be reflecting essentially degree held and amount of experience, two other variables that appear frequently. Teacher verbal ability, size of school, size of classes, the availability of various supplementary resources, and provision of supervisory and leadership personnel

are also variables that appear frequently.

Several researchers have touched on concepts that appear very fruitful for further research. In not many instances have researchers looked for non-linear relationships among variables. In a few instances, the logarithm of a variable has been entered into a prediction equation in an attempt to search for non-linear relationships. In at least one instance the cube of the number of English teachers available, though, a non-linear variable has been identified.

Much more important, however, is the notion that notall allocations of resources are equally applicable across grade level lines, across subject-matter lines, across ability lines, across socio-economiclines, etc. The research of Summers and Wolfe (1975) represents a major break-through in this concept. For example, they found that a greater amount of experience of a teacher is not always better than a lesser amount. In Philadelphia, at least, high achievement seems to be associated with children whose teachers have less than 7 or more than 10 years of experience. Why such a gap would exist is open to conjecture, but it points out that prediction research can often "average out" important effects if the data gathered are not detailed enough. As a further example, the research shows that tracking appears to be desirable for white students and not for minority students. If in studying tracking, the data for all students are lumped together, tracking may not appear to be very important one way or the other. On the other hand, if the effect on different sub-groups of students is studied, important advantages or disadvantages may become apparent quickly.

The implications for further research should be obvious.

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